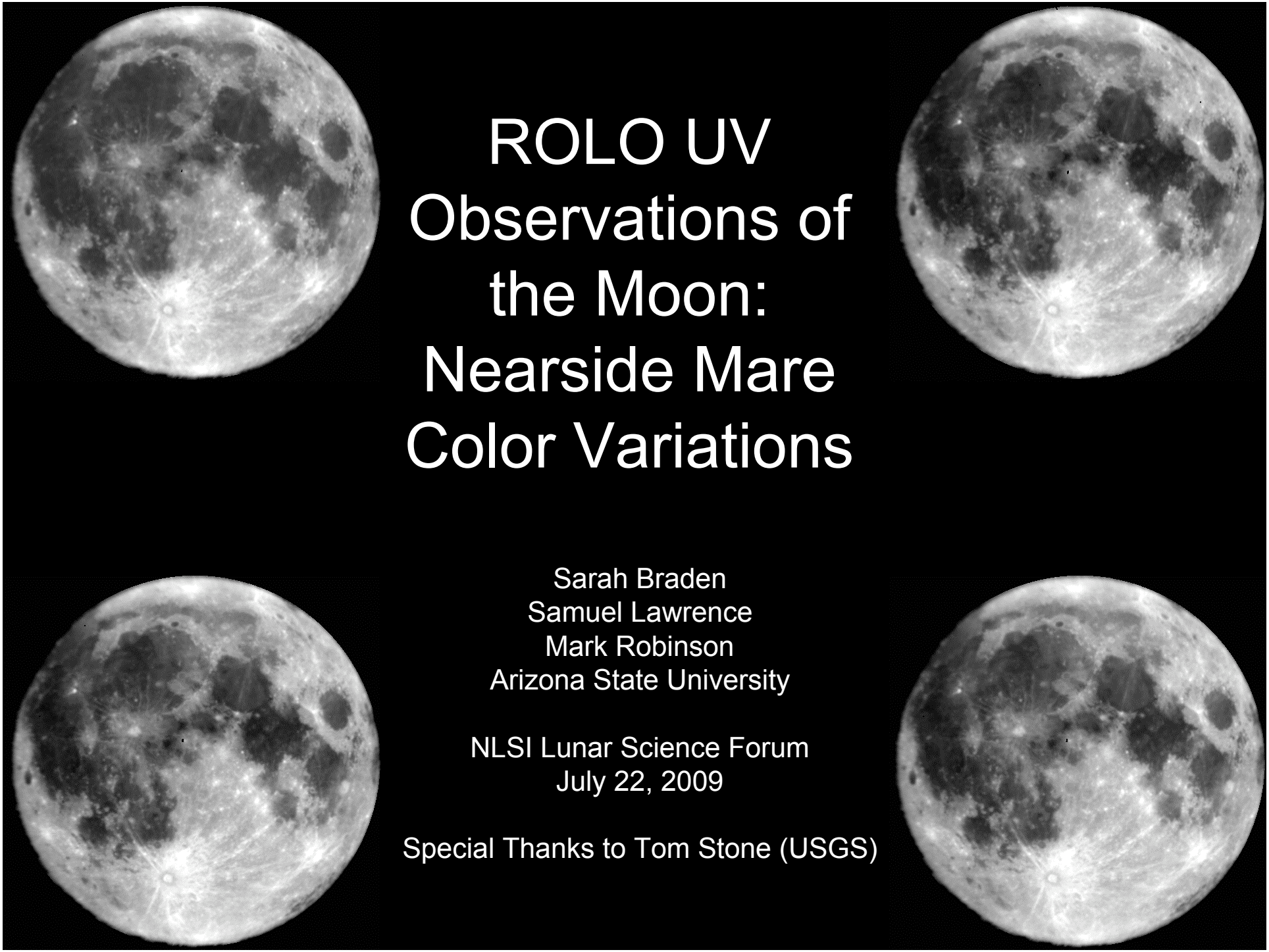

ROLO UV Observations of the Moon: Nearside Mare Color Variations

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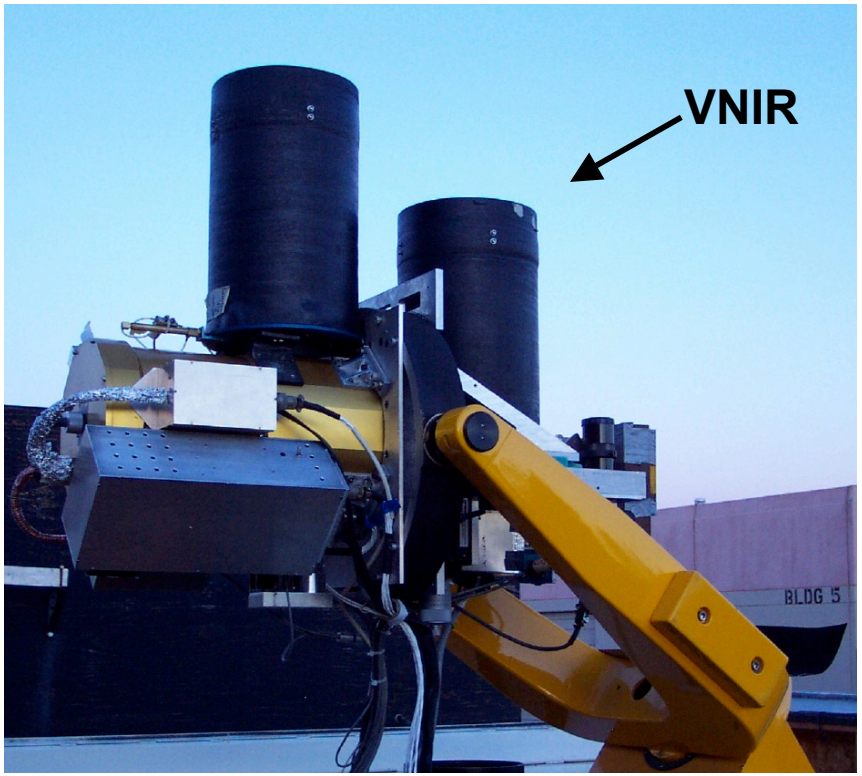
RObotic **L**unar **O**bservatory

- VNIR: 23 bands
- Specific interest in UV 350 nm band
- ~7 km/px resolution
- 6+ years of radiance measurements
- Absolute calibration based on observations of Vega
- Atmospheric correction derived from nightly stellar extinction measurements

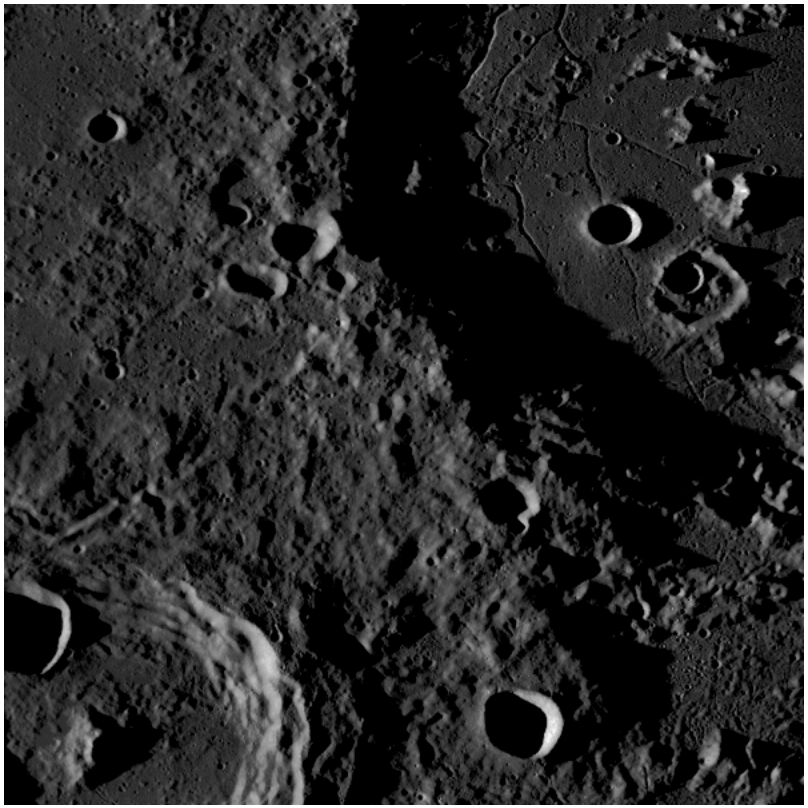


ROLO at the USGS:

VNIR: 350-950 nm SWIR 950-2450 nm

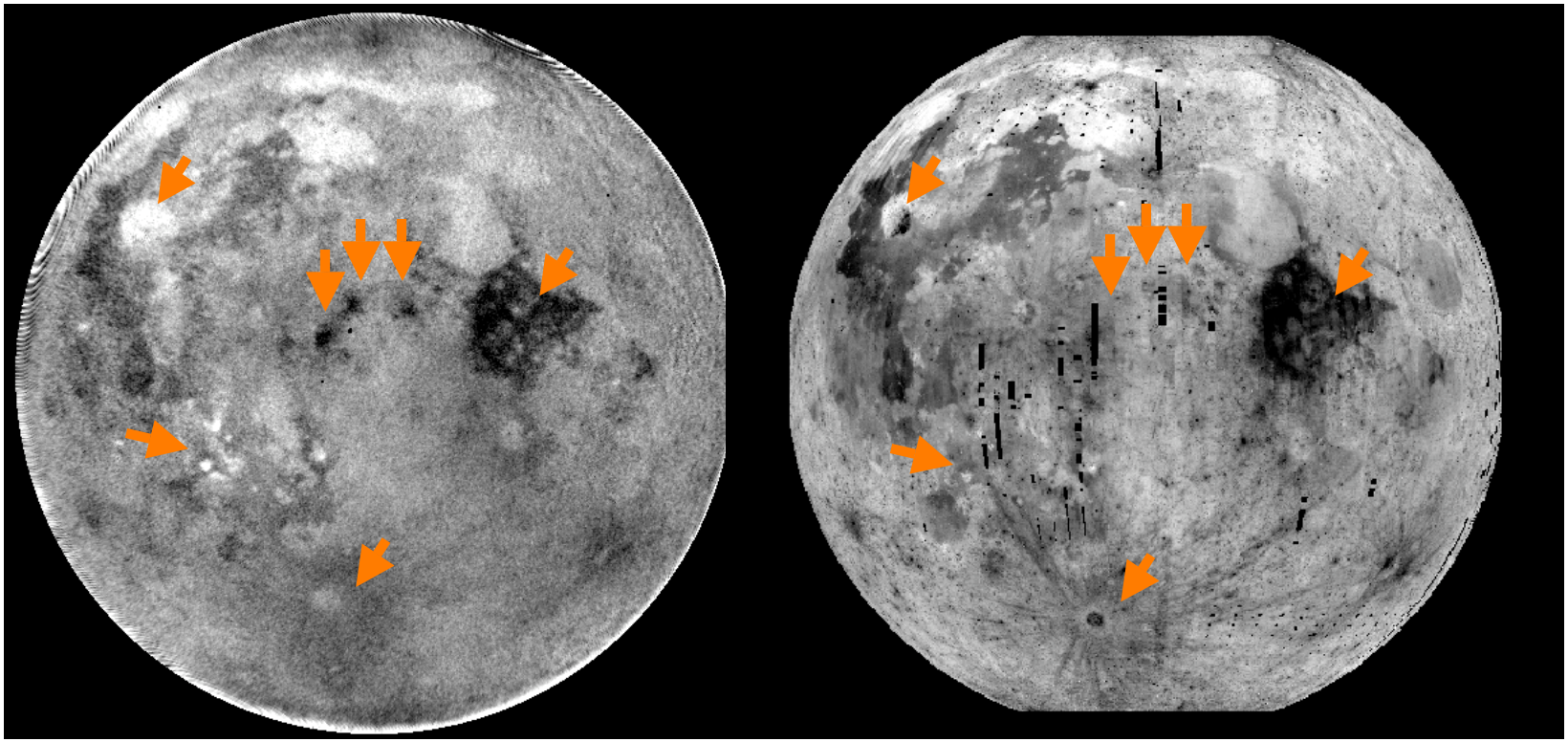
Goals

- Use ROLO data as a standard for calibration of the LROC WAC
- Examine geologic units in different ratios to interpret the context of surface composition and mineralogy
- Specific interest in UV wavelengths



Mosaic of craters Hahn (lower left) and Gauss (upper right), a floor-fractured crater, acquired by the Wide Angle Camera 560 nm filter. Scene is approximately 160 km across.
[NASA/GSFC/Arizona State University]

ROLO 415/350 vs Clem 750/415



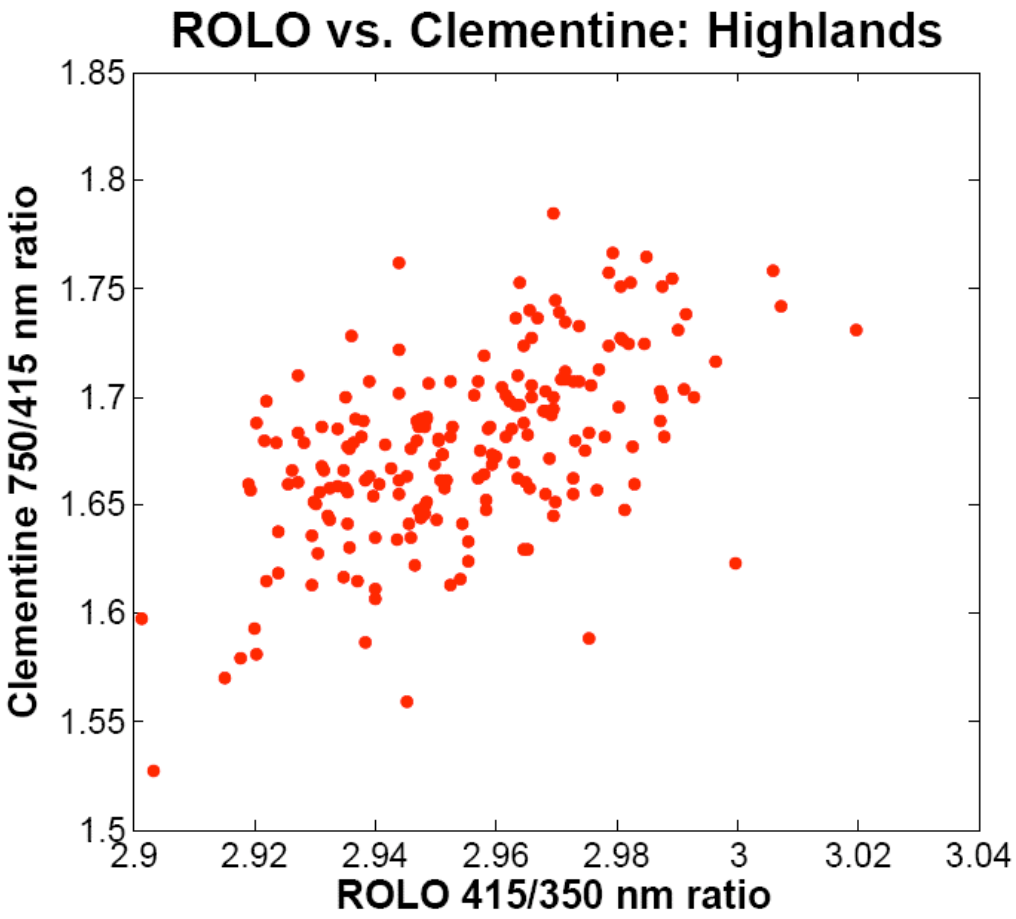
415/350 nm, ~0 phase angle

750/415 nm

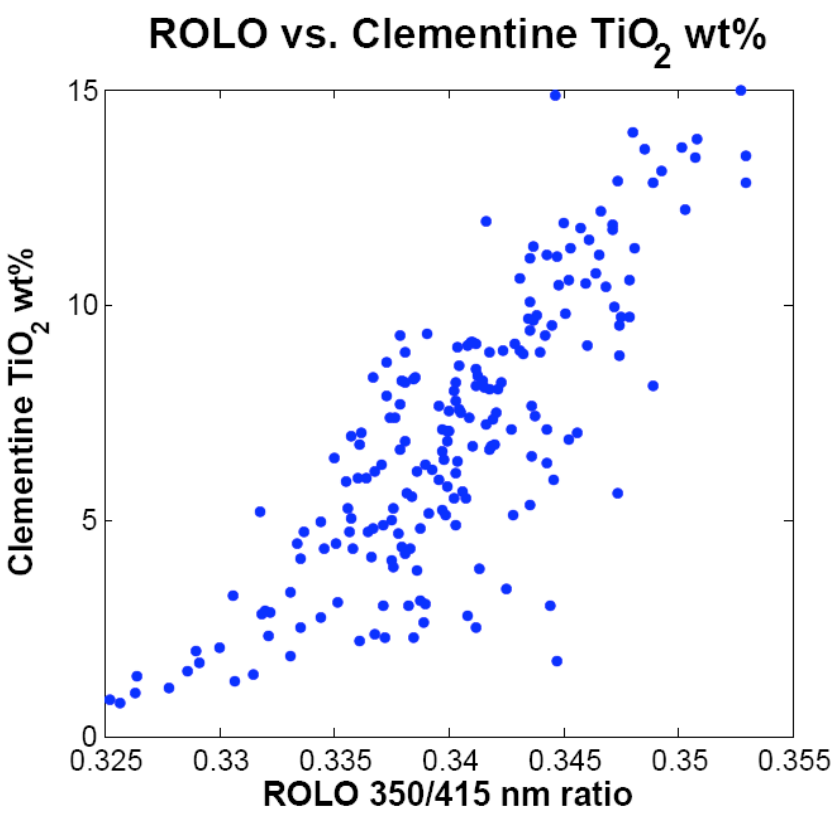
- Maturity not as visible in 415/350 ratio
- Distinct differences

Clementine vs ROLO ratio

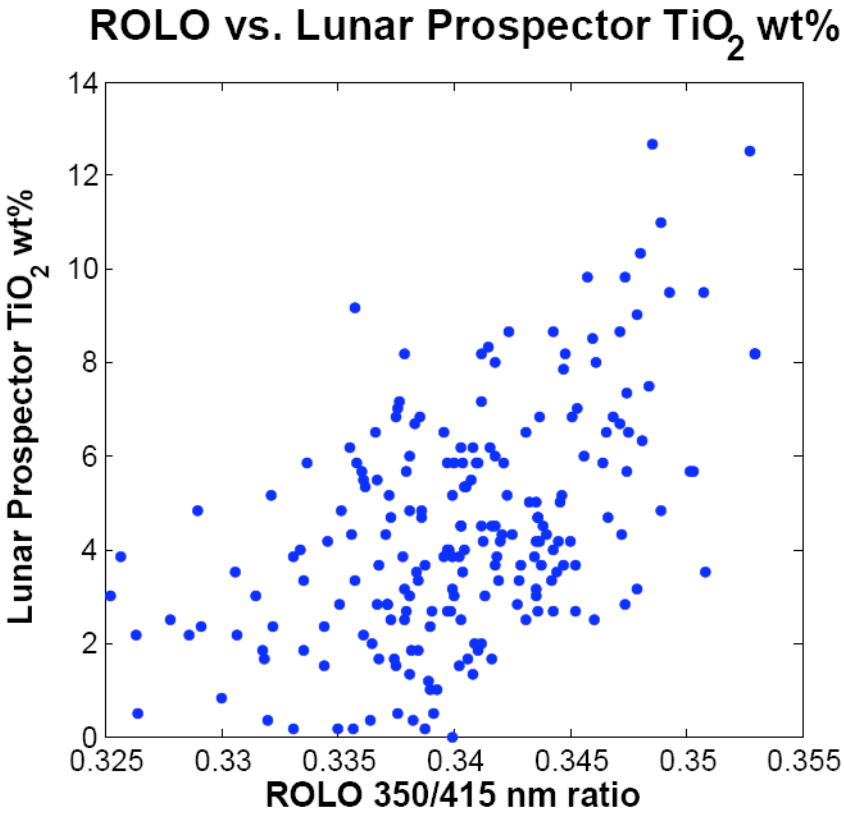
- Points are manually selected in each image
- 3x3 pixel boxes
- Mare: R^2=0.76
- Highlands: R^2=0.32



Titanium Variation in Maria

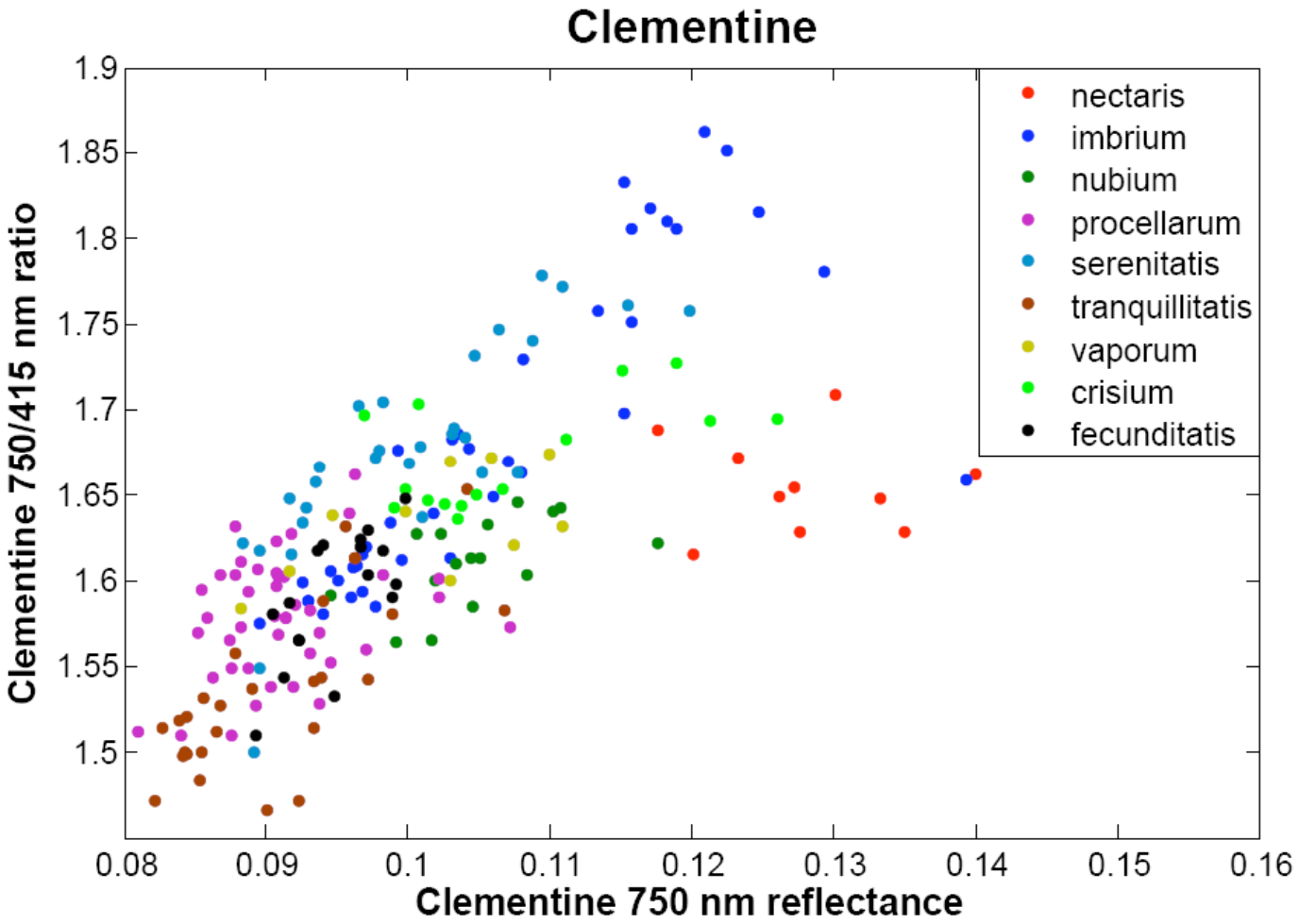


R^2=0.66



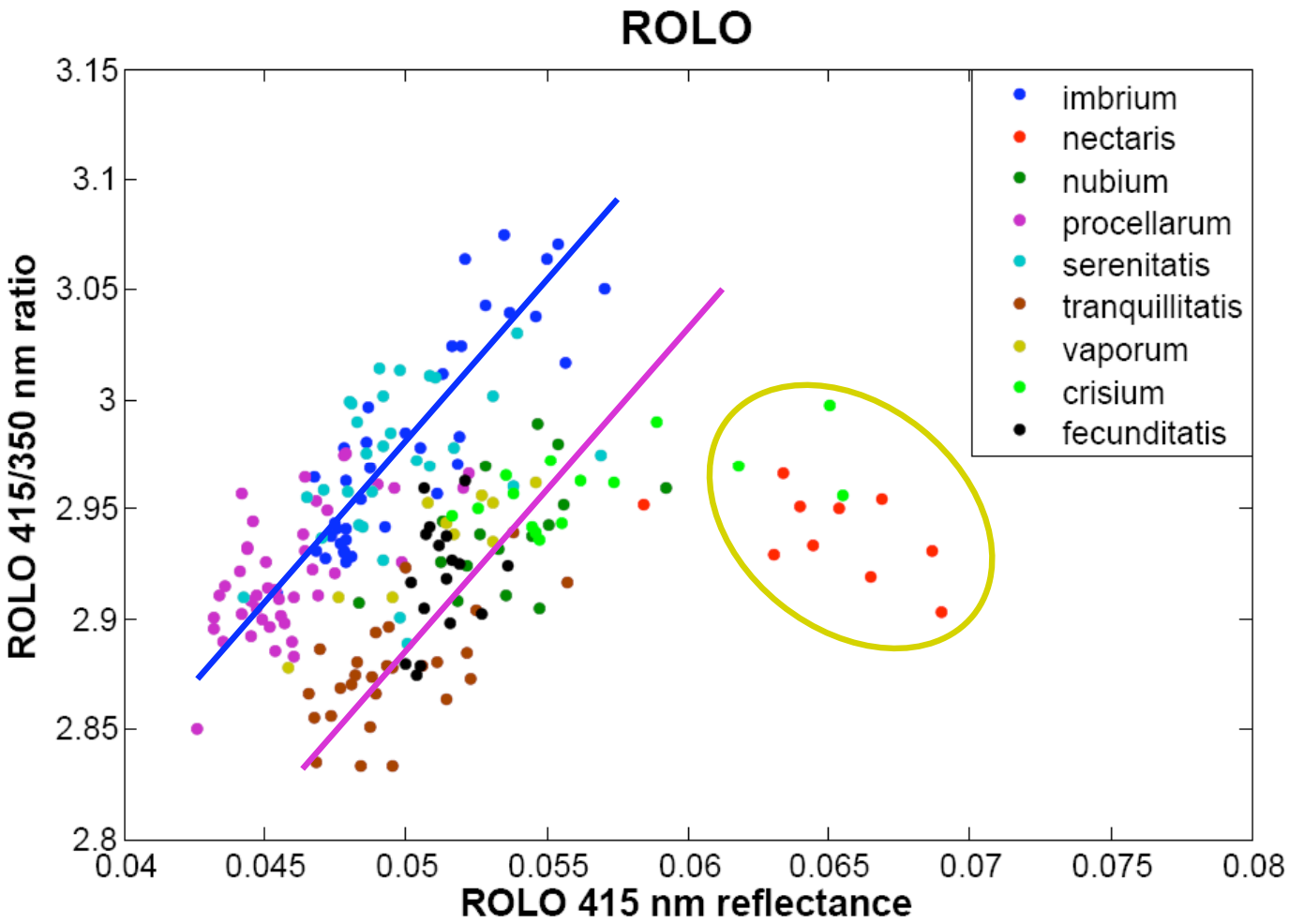
R^2=0.26

Maria



Clusters of data points from mare regions overlap

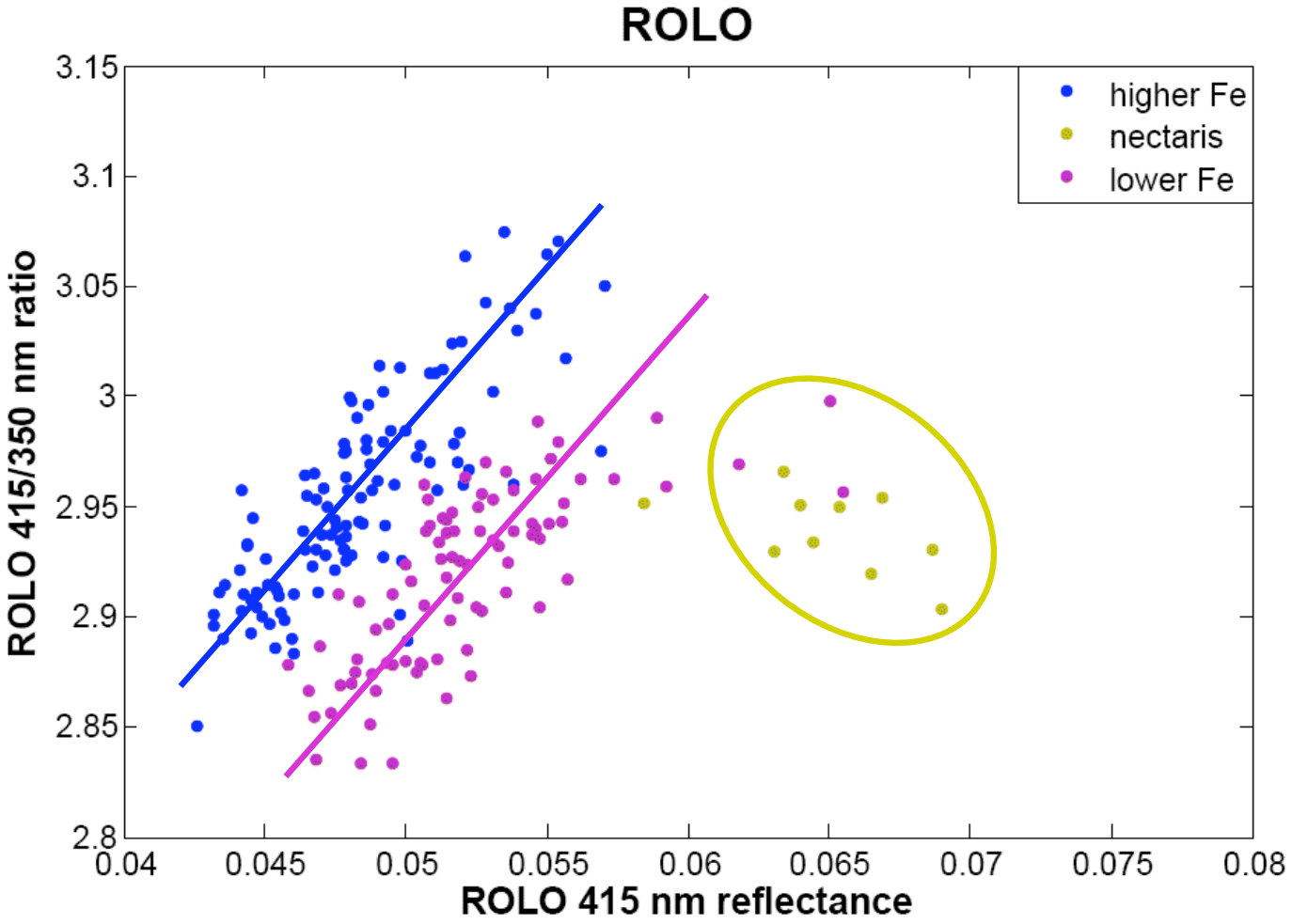
Maria



Clusters of data points form three distributions

Both distributions have similar ranges of Ti abundance

Maria: Fe Trend

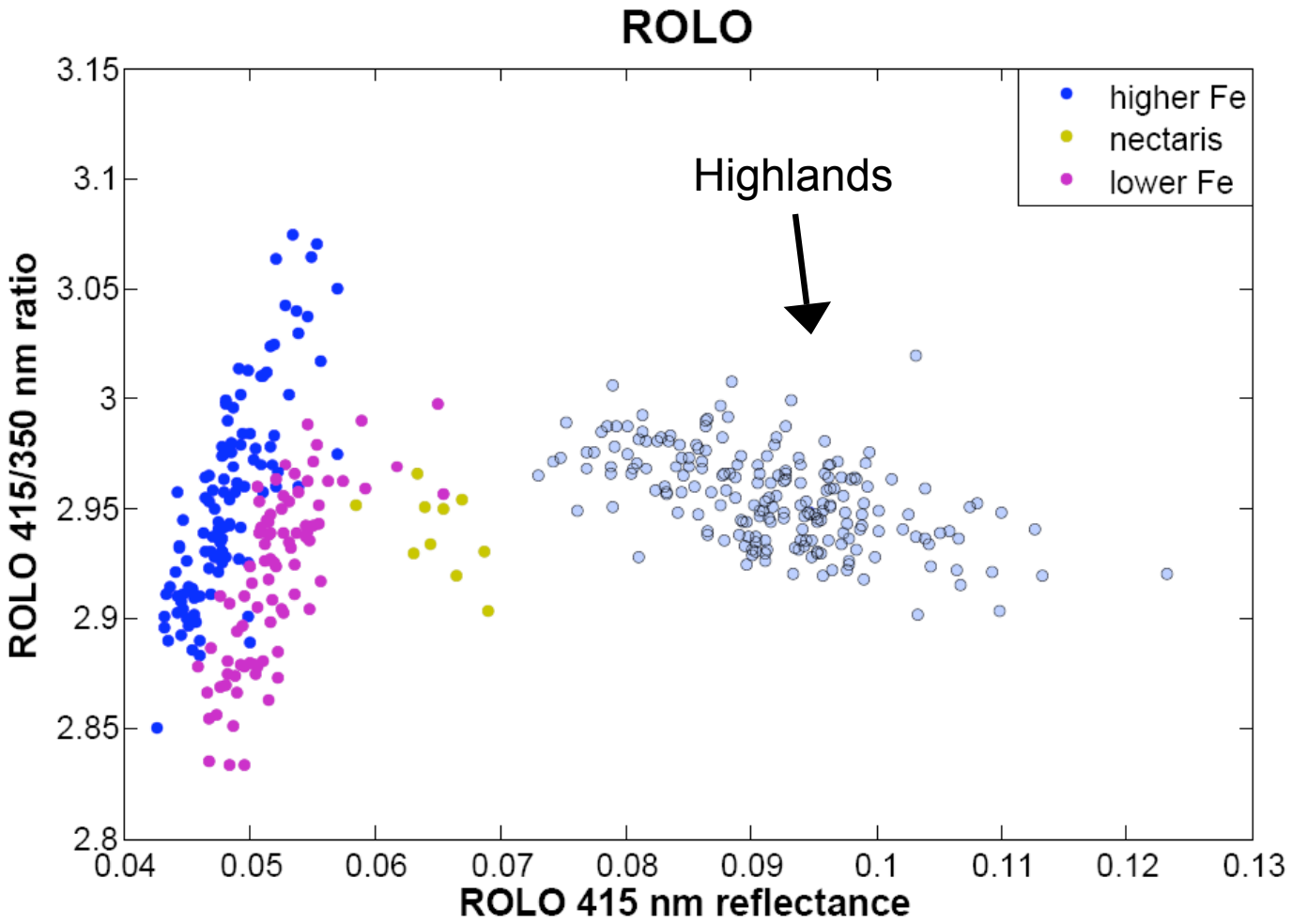


Procellarum, Serenitatis, and Imbrium points are high Fe: 16-25 wt%

Other maria are lower in Fe: 14-20 wt%

Mare Nectaris and parts of Crisium: low Fe and low Ti

Maria and Highlands



Nectaris is intermediate between mare and highland ROLO color and iron content

Conclusions

350 UV color contrast is useful for delimiting mare units – especially with relation to iron content

Only a small contrast for immature materials – related to space weathering, possibly nanophase iron

ROLO 415/350 nm VIS/UV ratio correlates to the Lucey Clementine TiO2 wt% map

Current Work

- UV photometric calibration for the LROC WAC
- Closer look at individual mare units